

## **Monitoring Group**

### **Question 1 & 2 merged:**

**Repeated theme: We need the proper temporal and spatial resolution to resolve changes related to habitat fragmentation, habitat change, genetic diversity and organism/population movement and abundance in a geo-spatial, four dimensional framework are important.**

A primary issue is the continuity of measurements and moving research to operations.

“Switch Turners” needed to do different research varies. For example target resolutions are one meter, nanometer hyper-spectrally, and hourly to resolve coastal-ocean issues (e.g. coral reef patchiness).

We need to monitor the Earth more intensively, more comprehensively and more frequently. Interest to remotely sense from the individuals scale to the global scale. More marketing is need for Earth Sciences.

One solution to the challenge of monitoring rapidly changing conditions (e.g. eddy currents) is a constellation of small satellites to increase frequency of sampling. Another solution is geostationary satellites and sensors (for them) will help repeatability for non-weather issues.

The question of how do ecosystems change, what are the habitat preferences of organisms and have they changed is important.

The issue of ecosystem health to human health is considered important.

Automated techniques to data mine and process data are important.

We must establish baselines to determine statistically significant relationships which will help learn the functional relationships.

Greater use of unoccupied craft (e.g. drones, submersible gliders) could be used to fill in gaps in data collection in three dimensions.

What sensors are needed to take advantage of such technologies of Google Earth and GPS

Acoustic remote sensing (e.g. birds and fish) is also important for distribution, abundance, and health.

### **Question 3 Partnerships**

We are unsatisfied with the level of cooperation and coordination between agencies (e.g. NASA and NOAA). Better and real relationships with other agencies should occur immediately. OSTP should facilitate the development a concrete plan to work together quickly. The new Administration provides an enhanced opportunity to mend fences.

Partnerships (bold ones are of relatively higher priority)

**NASA**

**NOAA**

**EPA**

**NSF (IRIS, OOI, NEON, CUAHSI, Cyber Infrastructure)**

**USGS**

**Dept Agriculture**

**Center of Disease Control**

Climate Change Science Program

National Institute of Health

Department of Agriculture

Department of the Interior (National Park Service, Fish and Wildlife Service

Argo Float Program (and other floating platforms)

Museums of the world

National Phenology Network

Fishing industry (to get access to high resolution catch/effort data)

In addition, stronger international partnerships are needed for data access from international agencies that have existing missions (e.g. ocean color and radar) or are launching new missions is critical.

Better integration among some NASA programs would be helpful. NASA can lead an effort to coordinate inter-agency, intra-agency, and with the science community to prepare a strategy to make the most effective use of the NPP/VIIRS sensor and sensors to be flown during the NPP era. In parallel, NASA should engage in high-level discussions with NOAA to accomplish this and also to see whether incremental improvements can be made to future NPOESS sensors.

Specifically, NASA and the NASA community can take leadership to develop:

- sensible and comprehensive land, ocean, atmosphere cal/val programs
- initiate science planning (campaigns, science questions, etc.)
- data archive, reprocessing capability and distribution capability

NASA should build on this and explore science concepts with the community that take advantage of future missions, specifically:

- HyspIRI
- ACE
- GEO-CAPE

These missions complement each other with "nested" spectral, spatial, and temporal resolution which provide unprecedented capabilities to address new science questions. They also have commonalities that will require NASA and sister agencies to develop a coordinated strategy that builds on the NPP/VIIRS efforts mentioned above in:

- sensible and comprehensive land, ocean, atmosphere cal/val programs
- initiate science planning (campaigns, science questions, etc.)
- data archive, reprocessing capability and distribution capability

Cost benefit models and partnerships with socio-economic organizations would fill a gap (e.g. the value of urban long term ecological sites).

If NASA could assist getting permission for exact location of FIA plots.

#### **Question 4:**

With regard to quality in-situ measurements, including acoustic data (important for presence, absence data and health issues) we need to link in-situ data collection platforms to remote sensing platforms for professional science and citizen science. The Census of Marine Life is an opportunity to use environmental data derived from satellites with in-situ distribution, occurrence and possibly abundance data. This is an example of an opportunity and there are others.

Question 5: Where do we start?

Habitat use change related to alternative energy development and human health issues e.g. H1N1 virus

Global "hot spots" related to economic development and ecosystem destruction.

Where we have gaps in science knowledge and sensor development.

Are we prepared to take advantage of the data generated by web2.0 and enhance it?